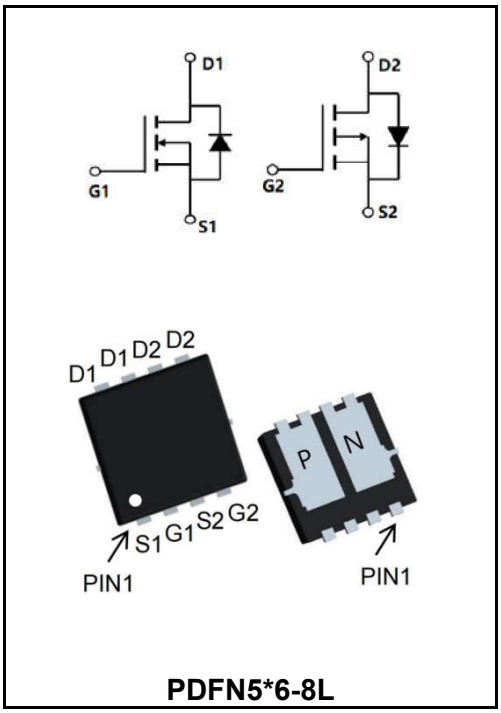
60V N+P-CHANNEL ENHANCEMENT MODE MOSFET

MAIN CHARACTERISTICS

I_D	10A
V_{DSS}	60V
R_{DSON}-typ(@V_{GS}=10V)	< 40mΩ(Type:35 mΩ)
I_D	-9.5A
V_{DSS}	-60V
R_{DSON}-typ(@V_{GS}=-10V)	< 70mΩ(Type:55 mΩ)



PDFN5*6-8L

Application

- Battery protection
- Load switch
- Uninterruptible power supply

Product Specification Classification

Part Number	Package	Marking	Pack
YFW10G06NF	PDFN5*6-8L	YFW 10G06NF XXXXX	5000PCS/Tape

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbols	Value		Units
		N-Ch	P-Ch	
Drain-Source Voltage	V_{DS}	60	-60	V
Gate - Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current, V_{GS} @ 10V[1]@T_A=25℃	I_D	10	-9.5	A
Continuous Drain Current, V_{GS} @ 10V[1]@T_A=70℃	I_D	5.2	-4.3	A
Pulsed Drain Current[2]	I_{DM}	30	-27	A
Single Pulse Avalanche Energy[3]	E_{AS}	25.5	35.3	mJ
Avalanche Current	I_{AS}	22.6	-26.6	A
Total Power Dissipation[4]@T_A=25℃	P_D	1.5	1.5	W
Storage Temperature Range	T_{STG}	-55 to +150		°C
Operating Junction Temperature Range	T_J	-55 to +150		°C
Thermal Resistance Junction-Ambient [1]	$R_{\theta JA}$	85		°C/W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	36		°C/W

N-Channel Electrical Characteristics (TJ=25 ℃, unless otherwise noted)

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	BV_{DSS}	60	66	-	V
BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	$\Delta BV_{DSS/\Delta TJ}$	-	0.063	-	V/℃
Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=4A	$R_{DS(ON)}$	-	35	40	mΩ
	V_{GS}=4.5V, I_D=2A		-	38	45	
Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	$V_{GS(th)}$	1.2	1.6	2.5	V
$V_{GS(th)}$ Temperature Coefficient		$\Delta V_{GS(th)}$	-	-5.24	-	mV/℃
Drain-Source Leakage Current	V_{DS}=48V, V_{GS}=0V T_J=25℃	I_{DSS}	-	-	1	uA
	V_{DS}=48V , V_{GS}=0V , T_J=55℃		-	-	5	
Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}	-	-	±100	nA
Forward Transconductance	V_{DS} = 5V, I_D = 4A	g_{fs}	-	21	-	S
Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	R_g	-	3.2	-	Ω
Total Gate Charge(4.5V)	V_{DS}=48V V_{GS}=4.5V I_D=4A	Q_g	-	12.6	-	nC
Gate-Source Charge		Q_{gs}	-	3.2	-	
Gate-Drain Charge		Q_{gd}	-	6.3	-	
Turn-on delay time	V_{DD} =30V V_{GS}=10V R_G = 3.3Ω I_D= 4A	$t_{d(on)}$	-	8	-	ns
Rise Time		T_r	-	14.2	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	24.4	-	
Fall Time		t_f	-	4.6	-	
Input Capacitance	V_{DS}=15V V_{GS}=0V f=1MHz	C_{iss}	-	1378	-	pF
Output Capacitance		C_{oss}	-	86	-	
Reverse Transfer Capacitance		C_{rss}	-	64	-	
Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	I_S	-	-	4.8	A
Pulsed Source Current[2,5]		I_{SM}	-	-	9.6	A
Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	V_{SD}	-	-	1.2	V

Note :
1.The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is VDD=-25V,VGS=-10V,L=0.1mH,IAS=-26.6A
4.The power dissipation is limited by 150℃ junction temperature
5.The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation

P-Channel Electrical Characteristics (TJ=25 ℃, unless otherwise noted)

Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250uA	BV_{DSS}	-60	-66	-	V
BVDSS Temperature Coefficient	Reference to 25℃ , I_D=-1mA	$\Delta BV_{DSS/\Delta TJ}$	-	-0.03	-	V/℃
Static Drain-Source On-Resistance[2]	V_{GS}=-10V, I_D=-3A	$R_{DS(ON)}$	-	55	70	mΩ
	V_{GS}=-4.5V, I_D=-2A		-	75	105	
Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	$V_{GS(th)}$	-1.2	-1.5	-2.5	V
$V_{GS(th)}$ Temperature Coefficient		$\Delta V_{GS(th)}$	-	4.56	-	mV/℃
Drain-Source Leakage Current	V_{DS}=-48V, V_{GS}=0V T_J=25℃	I_{DSS}	-	-	1	uA
	V_{DS}=-48V , V_{GS}=0V , T_J=55℃		-	-	5	
Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}	-	-	±100	nA
Forward Transconductance	V_{DS} = -5V, I_D = -3A	g_{fs}	-	15	-	S
Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	R_g	-	13.5	-	Ω
Total Gate Charge(-4.5V)	V_{DS}=-48V V_{GS}=-4.5V I_D=-3A	Q_g	-	9.86	-	nC
Gate-Source Charge		Q_{gs}	-	3.1	-	
Gate-Drain Charge		Q_{gd}	-	2.95	-	
Turn-on delay time	V_{DD} =-15V V_{GS}=-10V R_G = 3.3Ω I_D=-1A	$t_{d(on)}$	-	28.8	-	ns
Rise Time		T_r	-	19.8	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	60.8	-	
Fall Time		t_f	-	7.2	-	
Input Capacitance	V_{DS}=-15V V_{GS}=0V f=1MHz	C_{iss}	-	1447	-	pF
Output Capacitance		C_{oss}	-	97.3	-	
Reverse Transfer Capacitance		C_{rss}	-	70	-	
Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	I_S	-	-	-3.7	A
Pulsed Source Current[2,5]		I_{SM}	-	-	-7.5	A
Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	V_{SD}	-	-	-1.2	V

Note :
1.The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is VDD=25V,VGS=10V,L=0.1mH,IAS=22.6A
4.The power dissipation is limited by 150℃ junction temperature
5.The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation

Ratings and Characteristic Curves

N-Channel Typical Characteristics

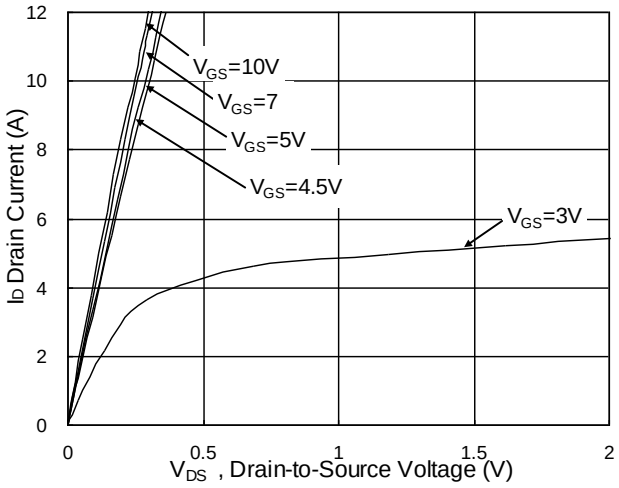


Fig.1 Typical Output Characteristics

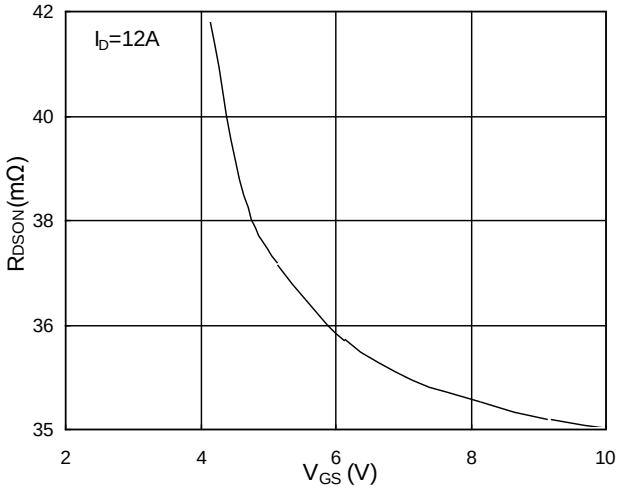


Fig.2 On-Resistance v.s Gate-Source

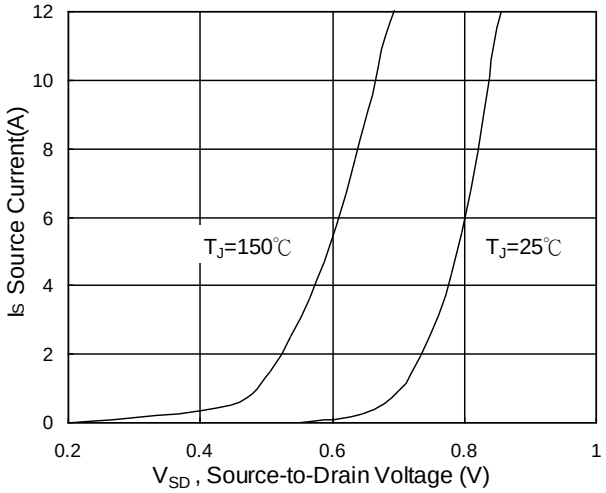


Fig.3 Forward Characteristics of Reverse

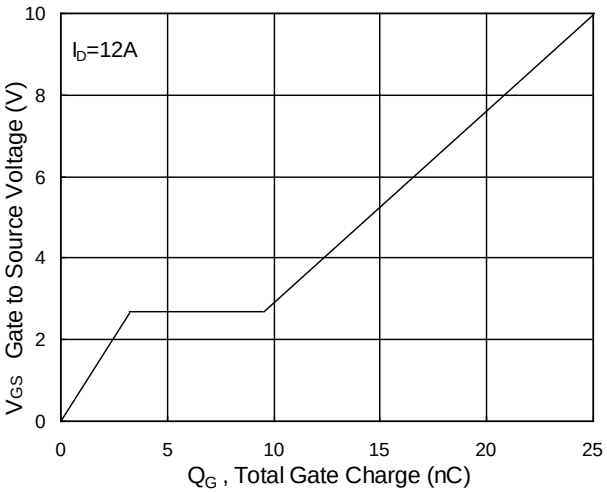


Fig.4 Gate-Charge Characteristics

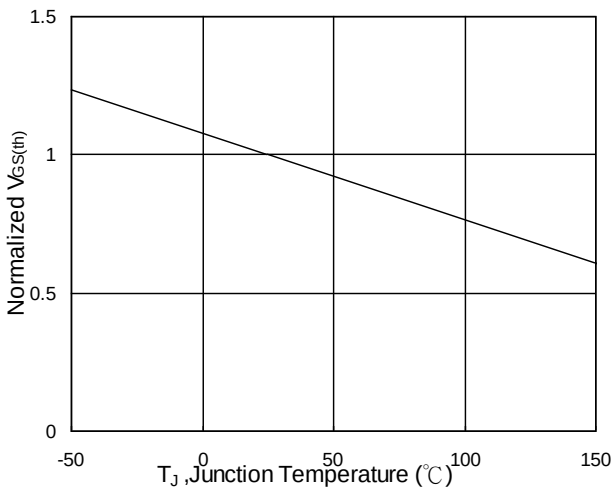


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

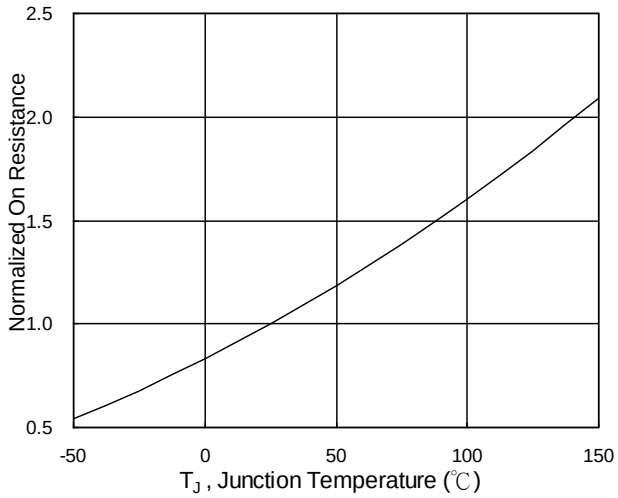


Fig.6 Normalized R_{DSON} v.s T_J

Ratings and Characteristic Curves

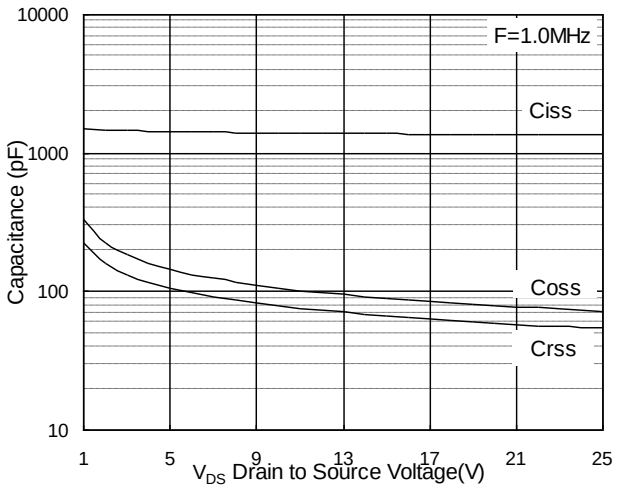


Fig.7 Capacitance

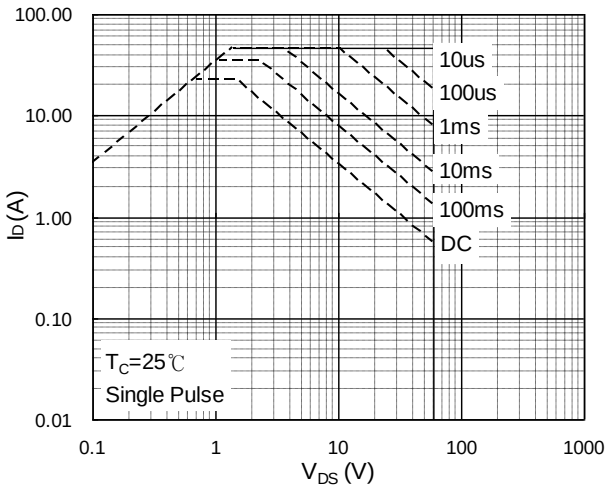


Fig.8 Safe Operating Area

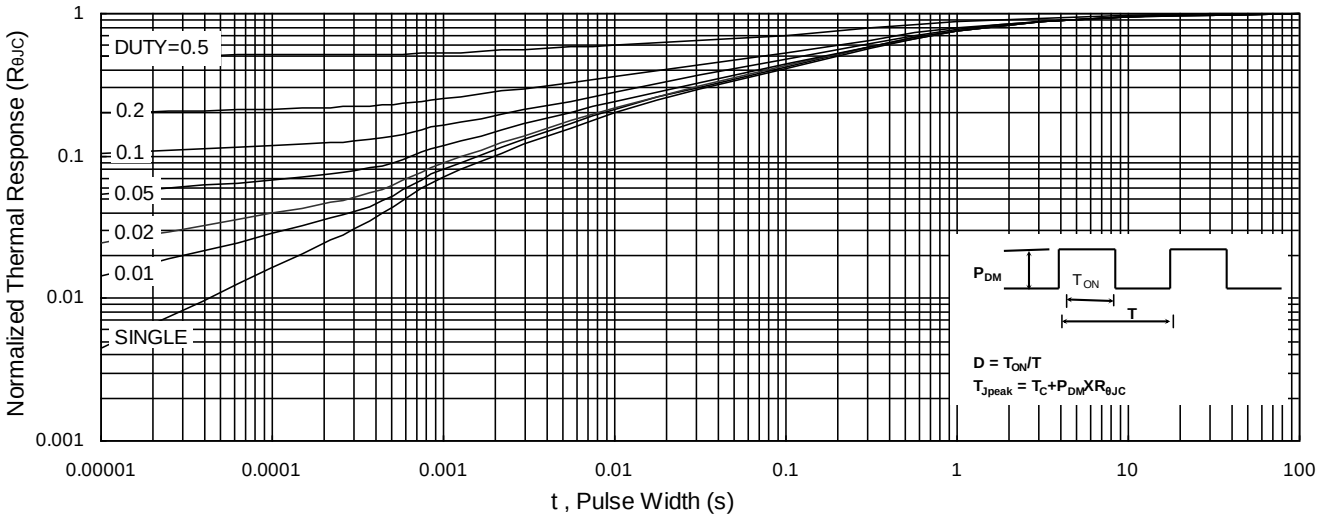


Fig.9 Normalized Maximum Transient Thermal Impedance

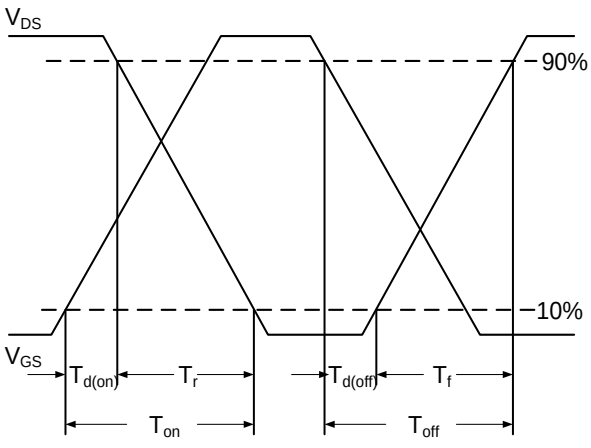


Fig.10 Switching Time Waveform

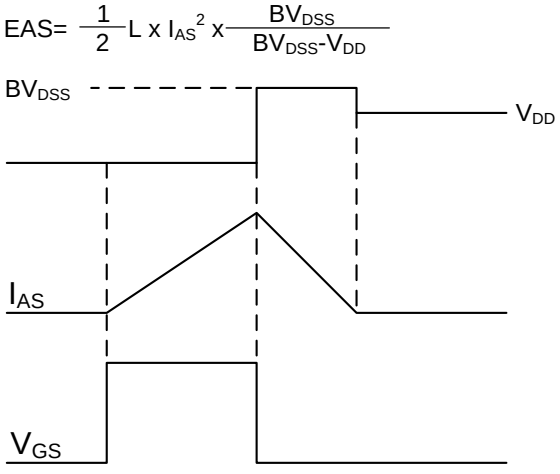


Fig.11 Unclamped Inductive Waveform

Ratings and Characteristic Curves

P-Channel Typical Characteristics

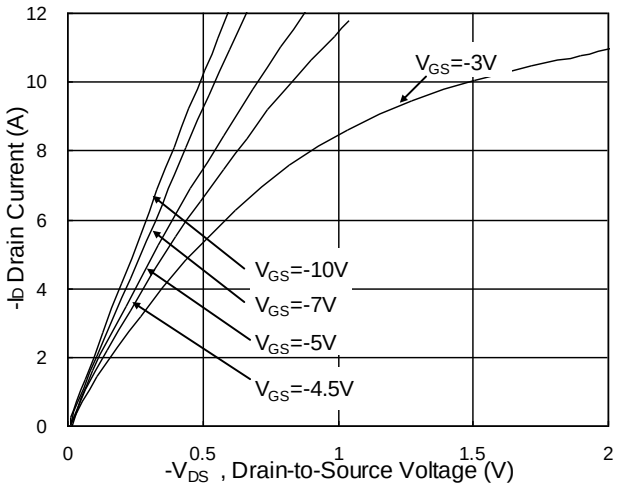


Fig.1 Typical Output Characteristics

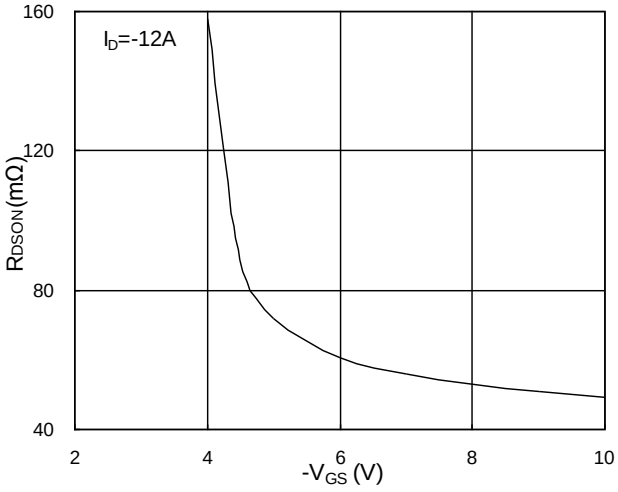
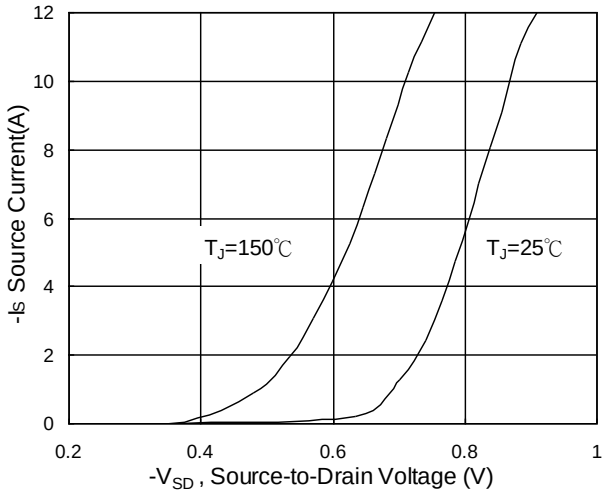


Fig.2 On-Resistance v.s Gate-Source



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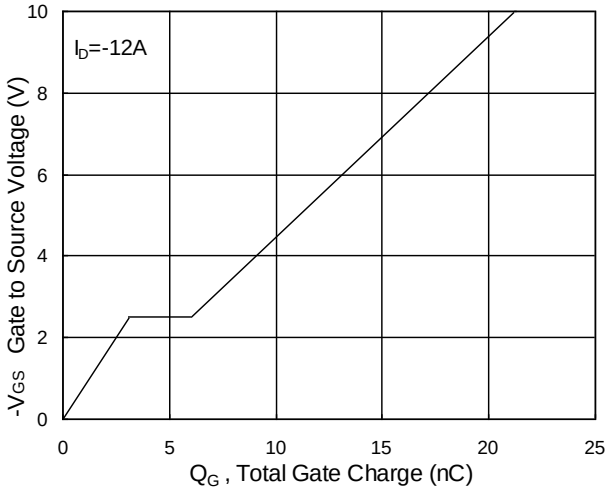


Fig.4 Gate-Charge Characteristics

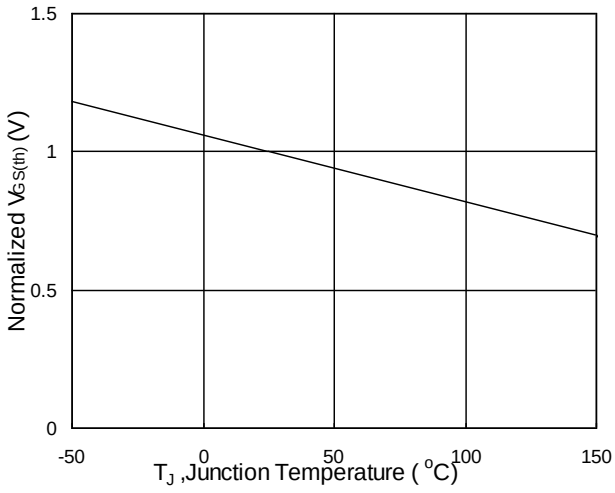


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

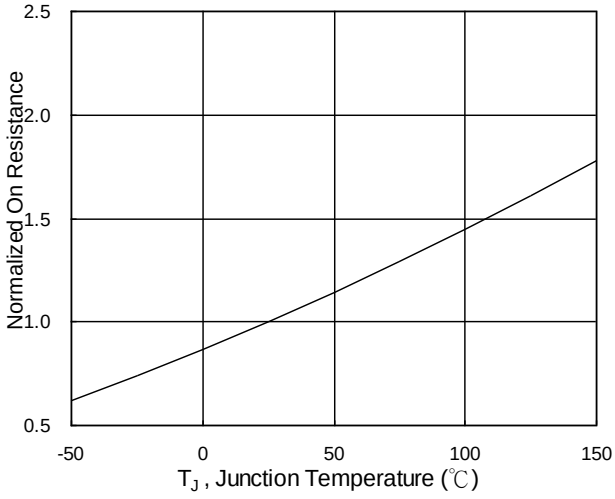


Fig.6 Normalized R_{DSON} v.s T_J

Ratings and Characteristic Curves

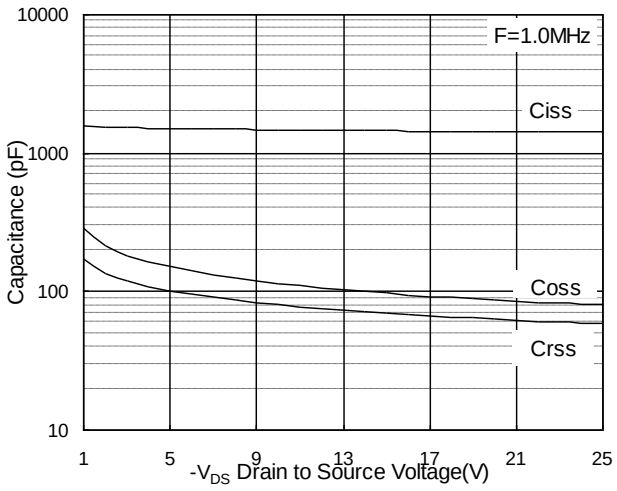


Fig.7 Capacitance

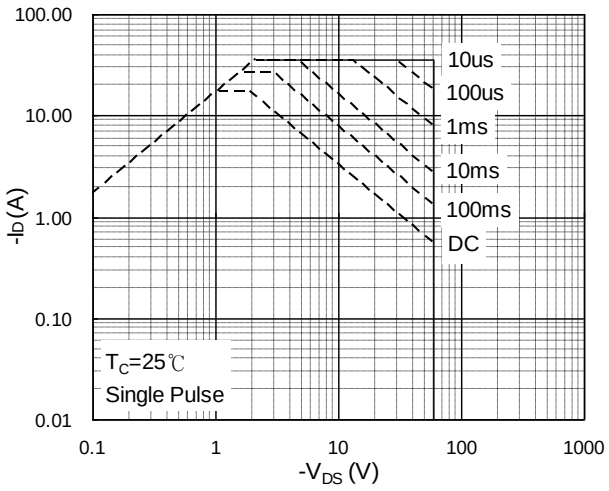
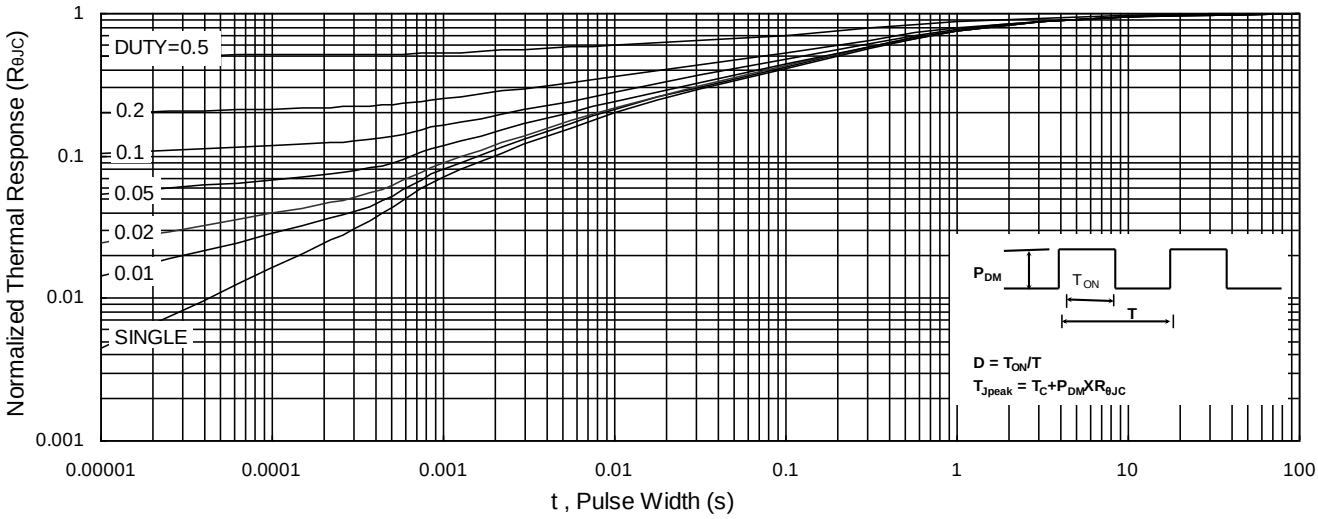


Fig.8 Safe Operating Area



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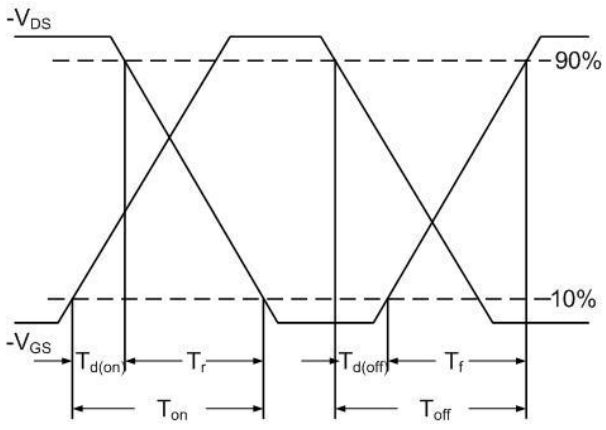


Fig.10 Switching Time Waveform

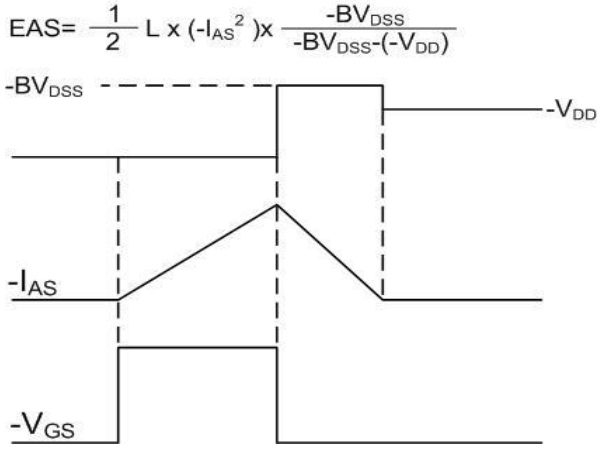
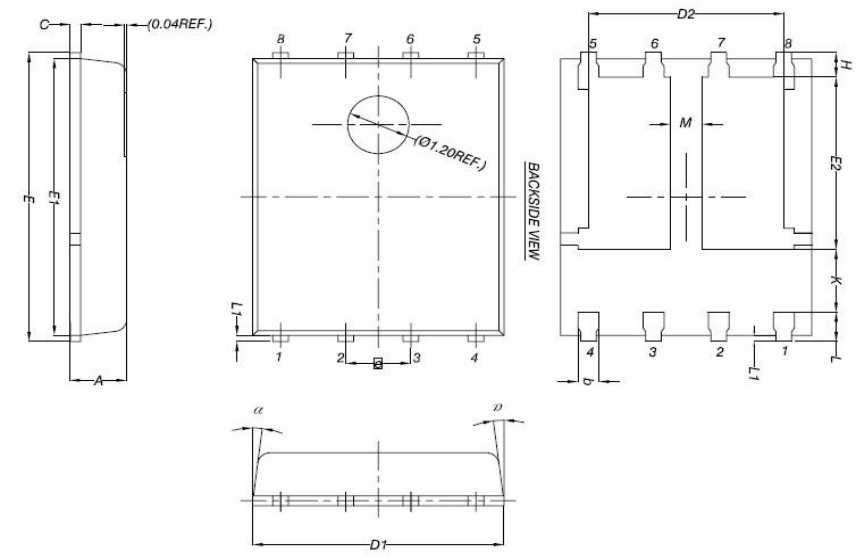


Fig.11 Unclamped Inductive Waveform

Package Outline Dimensions Millimeters

PDFN5*6-8L



Symbol	Common		
	mm		
	Mim	Nom	Max
A	0.90	1.00	1.10
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.66	5.76	5.83
E2	3.37	3.47	3.58
e	1.27BSC		
H	0.41	0.51	0.61
K	1.10	--	--
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
M	0.50	--	--
a	0°	--	12°